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PART III:

ENVIRONMENTAL PROTECTION AGENCY

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PETROLEUM REFINERY FLUID CATALYTIC CRACKING UNIT CATALYST REGENERATORS

Proposed Standards of Performance for New Stationary Sources

ENVIRONMENTAL PROTECTION AGENCY

[40 CFR Part 60]

[FRL 594-4]

STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

Petroleum Refinery Fluid Catalytic Cracking Unit Catalyst Regenerators

Under the authority of section 111 of the Clean Air Act, as amended, the Administrator is proposing a revision to 40 CFR 60.102(a)(2), and 60.105(e)(1), opacity standard of performance for new, modified, and reconstructed petroleum refinery fluid catalytic cracking unit catalyst regenerators.

PROPOSED REVISION

The proposed revision would change the opacity standard from 30 percent, except for three minutes in any one hour, to 25 percent, except for two six-minute average opacity readings in any one hour. The revised standard would be neither more nor less stringent than the present standard, but would be consistent with the new provisions for determining the opacity of emissions.

RATIONALE

On June 29, 1973, the U.S. Court of Appeals for the District of Columbia circuit remanded to EPA the new source performance standard for portland cement plants (40 CFR 60.62) promulgated under section 111 of the Clean Air Act (*Portland Cement Association* v. *Ruckelshaus*, 486 F. 2d 375). One of the issues remanded was the use of opacity standards. On November 12, 1974, EPA responded to the remand (39 FR 39872); and on May 22, 1975, the Court affirmed the use of opacity standards (513 F. 2d 506).

In the response, EPA reconsidered the use of opacity standards and concluded that they are a reliable, inexpensive, and useful means of ensuring that control equipment is properly maintained and operated at all times. EPA also made changes to the general provisions of 40 CFR Part 60 and to the test method for determining the opacity of emissions to eliminate the possibility of a properly maintained and operated source being in violation of the applicable opacity standard while concurrently meeting a mass or concentration emission standard applicable to the source.

The principal revisions to the regulations (40 CFR Part 60, Standards of Performance for New Stationary Sources) which apply to all opacity standards are as follows:

1. Reference Method 9 (the opacity test method) was revised to base compliance on the average of 24 consecutive opacity observations, each taken at 15-second intervals (six-minute average), and to define the maximum error associated with each set of opacity observtaions. The revision changing the averaging time to six minutes was included to require sufficient observation to ensure acceptable accuracy within the maximum average error referenced in Method 9. The use of sets of opacity data will preclude a single high reading from being cited as a violation.

2. Section 60.11(e) was added to provide a generally applicable mechanism for any owner or operator to petition the Administrator to obtain a higher opacity standard for any facility that demonstrates compliance with the mass or concentration emission standard concurrent with failure to comply with the opacity standard. This provision provides relief to those source owners and operators who install unusually large diameter stacks or whose emissions have unusual characteristics which could cause the opacity of the emissions to be greater than is typical for other plants in the same source category. The provision allows the promulgated opacity standards to be based on the maximum effects of particle characteristics and stack diameters at well-controlled new installations, and ensures that no owner or operator of an affected facility will be prejudiced if the facility is not able to meet the opacity standard while meeting the mass or concentration emission standard.

As a result of the revisions to Method 9, EPA has reevaluated the opacity standard for fluid catalytic cracking unit catalyst regenerators and concluded that it should be revised. This proposed revision of the opacity standard is consistent with the particulate emission standard for fluid catalytic cracking unit catalyst regenerators of 1.0 kilogram per 1000 kilograms of coke burn-off in the catalyst regenerator.

The proposed revision of the opacity standard is based primarily upon a reevaluation of the data gathered on facility A of the background document supporting promulgation of the opacity standard (*Background Information for New Source Performance Standards: Asphalt Concrete Plants, Petroleum Refineries, et al., Volume 3, Promulgated standards*, EPA-450/2-74-003, February 1973). Six-minute average opacity readings calculated from these data indicated that opacity seldom exceeded 20 percent, except during periods of soot blowing. Emission testing clearly indicated that this facility was meeting the particulate emission standard at the time these opacity data were gathered.

Three different emission control systems can be installed to comply with the particulate and carbon monoxide standards of performance. These systems are shown in Figure 1. The volume of gases discharged from control system 3 is about 30 percent greater than the volume of gases discharged from either control system 1 or 2. Consequently, the opacity of the gases discharged from system 3 is lower than that of the gases discharged from the other two systems. Facility A employed emission control system 3.

The opacity observed at facility A, therefore, is somewhat lower than that which would be observed at facilities which employed either emission control system 1 or 2. Extrapolating the opacity data from facility A using Bouger's Law indicates that the opacity at facilities using either of these other two emission control systems would not exceed 25 percent. Thus, the revised opacity standard is proposed at 25 percent.

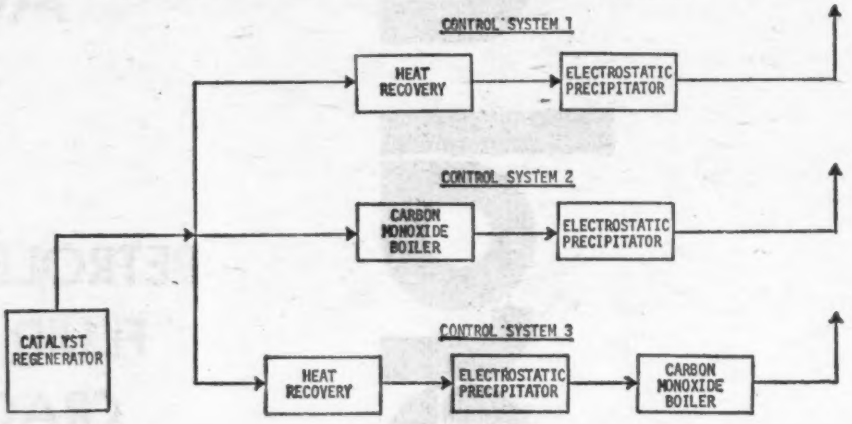

FIGURE 1. Alternative Emission Control Systems

Another factor which influences opacity, but not particulate emissions (in terms of the emission standard), is stack diameter. Generally, the larger the size of a fluid catalytic cracking unit, the larger the stack diameter. Facility A is about 50,000 barrels per day. Although the size of fluid catalytic cracking units may vary from 5,000 to 95,000 barrels per day, the typical facility within the petroleum refining industry is in the range of 25,000 to 50,000 barrels per day. The influence of this wide range in the size of fluid catalytic cracking units on opacity of the gases discharged from the catalyst regenerator can be calculated using Bouguer's Law. With particulate emissions of 1.0 kilogram per 1000 kilograms of coke burn-off, the opacity varies from as little as 10 percent for the smallest units (5,000 barrels per day) to as much as 40 percent for the largest units (95,000 barrels per day).

New fluid catalytic cracking units, however, are expected to be in the range of 25,000 to 50,000 barrels per day. Currently, there is only one 95,000 barrels-per-day unit, and only a few larger than 50,000 barrels per day. The proposed revision of the opacity standard, therefore, is based on the largest new fluid catalytic cracking unit that is likely to be built (i.e. 50,000 barrels per day). If fluid catalytic cracking units larger than

50,000 barrels per day are built, or existing units are modified or reconstructed, and these facilities have trouble meeting the proposed revised opacity standard, relief can be obtained through the mechanism of § 60.11(e).

At most fluid catalytic cracking units, carbon monoxide emissions are controlled by carbon monoxide boilers. Periodically, the boiler tubes require soot blowing to remove dust or soot deposited on these tubes. Soot blowing increases the opacity of the plume from the catalyst regenerator dramatically, although only momentarily. Rather than increase the level of the opacity standard to include soot blowing, therefore, it is more appropriate to provide an exemption from the standard. The opacity data indicate that an exemption of two six-minute average opacity readings per hour is necessary to permit soot blowing. Thus, an exemption for soot blowing is included in the proposed revision to the opacity standard.

It should be noted that standards of performance for new sources established under section 111 of the Clean Air Act reflect emission limits achievable with the best adequately demonstrated systems of emission reduction considering the cost of such system. State implementation plans (SIP's) approved or promulgated under section 110 of the Act, on the other hand, must provide for the attainment and maintenance of national ambient air quality standards (NAAQS) designed to protect public health and welfare. For that purpose SIP's must in some cases require greater emission reductions than those required by standards of performance for new sources. In addition, States are free under section 116 of the Act to establish more stringent emission limits than those established under section 111 or thos necessary to attain or maintain the NAAQS under section 110. Thus, new and existing sources may in some cases be subject to limitations more stringent than EPA's standards of performance under section 111.

PUBLIC PARTICIPATION

Interested persons may participate in this proposed rulemaking by submitting written comments (in triplicate) to the Emission Standards and Engineering Division, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, Attention: Mr. Don R. Goodwin. The Administrator will welcome comments on all aspects of the proposed revision.

All relevant comments received on or before October 29, 1976 will be considered. Comments received will be available for public inspection and copying at the EPA Public Information Reference Unit, Room 2922 (EPA Library), 401 M Street, S.W., Washington, D.C.

Background information on this proposed revision of the opacity standard for petroleum refinery fluid catalytic cracking unit catalyst regenerators has been published in a document "Reevaluation of Opacity Standards of Performance: Petroleum Refinery Fluid Catalytic Cracking Unit Catalyst Regenerators." Copies of this document may be obtained by writing to the Public Information Center (PM-215), U.S. Environmental Protection Agency, Washington, D.C. 20460 (specify Reevaluation of Opacity Standards of Performance: Petroleum Refinery Fluid Catalytic Cracking Unit Catalyst Regenerators).

AUTHORITY

This notice of proposed rulemaking is issued under authority of sections 111, 114, and 301(a) of the Clean Air Act, as amended by section 4(a) of Public Law 91-604, 84 Stat. 1678 and by section 15(c)(2) of Public Law 91-604, 84 Stat. 1713 (42 U.S.C. 1857c-6, 1857c-9, and 1857g(a)).

Dated: August 19, 1976.

RUSSELL E. TRAIN,
Administrator.

It is proposed to amend Part 60, Chapter I of Title 40 of the Code of Federal Regulations as follows:

1. Section 60.102(a)(2) is revised to read as follows:

§ 60.102 Standard for particulate matter.

(a) * * *

(2) Gases exhibiting greater than 25 percent opacity, except for two six-minute average opacity readings in any one hour. Where the presence of uncombined water is the only reason for failure to meet the requirements of this subparagraph, such failure shall not be a violation of this section.

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2. Section 60.105(e)(1) is revised to read as follows:

§ 60.105 Emission monitoring.

* * * * *

(e) * * *

(1) *Opacity.* All hourly periods in which there are three or more six-minute average opacity readings during which the average opacity of the gases discharged into the atmosphere from any fluid catalytic cracking unit catalyst regenerator subject to § 60.102 exceeds 25 percent.

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